

**MEMORANDUM OF UNDERSTANDING (MoU)
BETWEEN THE
FEDERAL AVIATION ADMINISTRATION (FAA)
AND THE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)
ON
AIRSPACE SYSTEM USER OPERATIONAL FLEXIBILITY AND PRODUCTIVITY**

I. BACKGROUND

Traditionally, the FAA and NASA have worked closely together in a number of areas to enhance the operating safety, efficiency and environmental compatibility of the air transportation system. Each area has a separate MoU stating the rationale and objectives of the activities to be undertaken. This MoU describes NASA/FAA cooperative activities to enhance aircraft user operational flexibility and productivity across the airspace.

II. RATIONALE

The explosive growth in air travel following the Airline Deregulation Act of 1978 has placed heavy demands on the National Airspace System (NAS). Airspace users have cited insufficient capacity, limited access, and operating restrictions as contributors to excessive operating costs and decreased efficiency for airspace users. The FAA is collaborating with the aviation industry to develop, validate and implement NAS system improvements that foster more flexible flight operations or what is commonly called "Free Flight." Free flight has been defined as:

A safe and efficient flight operating capability under instrument flight rules (IFR) in which the operators have the freedom to select their path and speed in real time. Air traffic restrictions are only imposed to ensure separation, to preclude exceeding airport capacity, to prevent unauthorized flight through special use airspace, and to ensure safety of flight. Restrictions are limited in extent and duration to correct the identified problem. Any activity which removes restrictions represents a move toward Free Flight.

III. OBJECTIVE

The objective of this MoU is to establish an understanding between FAA and NASA to achieve, through integrated research and development (R&D) activities, an air transportation system that better facilitates user operational flexibility and productivity throughout the airspace. In particular, it is envisioned that the FAA's expertise in air traffic management and NASA's expertise in aeronautics will be combined to carry out the research and development efforts required to achieve an integrated air-ground system that more fully meets the needs of airspace users for safe, efficient and cost effective flight operations. The initiative will address both near-term and long-term requirements. The initial emphasis will be on development and validation of system improvements that can be implemented within the next 10 years.

Areas for cooperative or joint activities may include, but will not be limited to, the following:

A. Roles of Flight Crews and Air Traffic Controllers

More flexible flight operations potentially involve new roles for flight crews and air traffic controllers. It is essential that proposals for modifying these roles are developed and fully validated based on sound human factors principles and practices.

B. Integration of ATM Cockpit and Fleet Management

Emerging technology has the potential to permit a much closer integration of ATM, cockpit flight management, and operational control centers established by aircraft operators to facilitate fleet management. The full development of this opportunity will foster user operational flexibility and productivity.

C. Cockpit Situational Awareness

Technology developed for the Traffic Alert and Collision Avoidance System (TCAS) and Automatic Dependent Surveillance-Broadcast (ADS-B) offers significant new opportunities to improve cockpit situational awareness both on the airport surface and throughout the airspace. These opportunities, and others, should be further developed as means for increasing the participation of flight crews in ATM decision making.

D. Conflict Detection and Resolution

A key fundamental capability to enabling user operational flexibility and productivity is the ability to accurately predict future aircraft conflicts and to resolve these conflicts in an efficient and safe manner. Automation technologies and pilot/controller roles for such capabilities must be developed and validated.

E. Flight Restrictions

It is essential that flight restrictions are minimized so as to maximize aircraft operational productivity. However, it is recognized that in regions of high dynamic density restrictions may be necessary. The transitions between flexible and restricted flight operations must be based upon clear, simple responsibilities and procedures to ensure safety. Concepts, technologies, responsibilities and procedures must be developed and validated to ensure meeting these objectives.

F. Safety Analysis

It is essential to ensure that no step in the transition to more flexible flight operations derogates safety. This will require extensive analyses and simulations of safety hazards, a better understanding of safety hazards in today's air transportation system, and development of tools for the proactive detection of potentially hazardous situations.

G. All Vehicle Classes

Flight operations must accommodate all users, including, but not limited to, transport, general aviation, rotorcraft, and military aircraft. It is essential that the system accommodates each of these aircraft classes while also assuring that avionics requirements are cost effective and affordable.

H. Cost-Benefit Assessments

Each step in the transition to more flexible flight operations must be substantiated by reliable cost-benefit estimates. These projections must include foreseen impacts on both airspace users and ATM service providers.

IV. AUTHORITY

A. NASA

This MoU is entered into on behalf of NASA under authority of the National Aeronautics and Space Act of 1958, as amended, 42 U.S.C 2473(c)(5) and (c)(6).

B. DOT/FAA

This MoU is entered into on behalf of FAA under the authority of the Federal Aviation Act of 1958, as amended, 49 U.S.C. Section 40101, *et seq.*

V. SCOPE OF ACTIVITIES AND MANAGEMENT

A. The scope of this initiative includes all FAA Research, Engineering, and Development activities related to traffic-flow management, and related advanced ATM functionality and all NASA activities related to ATM technology, including the Advanced Air Transportation Technology (AATT) program and relevant initiatives within NASA's base and Terminal Area Productivity programs.

B. Policy direction shall be provided, after joint conference, by the Associate Administrator for Research and Acquisitions of the FAA and the Associate Administrator for Aeronautics of NASA, or their appointees.

C. This initiative shall be managed by an FAA/NASA integrated product team (IPT). The leader of this interagency IPT shall be the FAA Traffic Flow Management IPT leader. NASA shall designate a deputy team leader to the FAA/NASA interagency IPT and shall participate as a full partner with FAA to ensure that both near- and long-term research perspectives are maintained. The interagency IPT is responsible for all aspects of the initiative, including R&D requirements definition, program planning, oversight, and communications with the user community.

D. Responsibility for detailed planning, control and execution of specific elements of the initiative will be delegated by the interagency IPT to project managers in FAA and NASA.

E. Memoranda of Agreement (MoA's), including formal procurement documentation, will be required when funds or other resources are to be transferred between FAA and NASA. These MoA's will be developed by the project managers involved and approved by the FAA/NASA interagency IPT. Each MoA will describe the task assignment, including objectives, plan, schedule, products, foreseen benefits and funding over the period of performance.

F. The Director of the Office of Aviation Research of the FAA and the Director for Subsonic Transportation of NASA are responsible for tracking and management of all FAA/NASA MoA's and will be included in the approval process for all MoA's developed under this MoU.

G. This initiative shall be monitored and guided by a committee comprised of users, industry representatives, and technical and operational experts drawn from existing FAA and NASA advisory committees.

VI. PRODUCTS AND REPORTS

Critical program objectives, plans, schedules, products and reports will be developed by the FAA/NASA interagency IPT.

VII. FUNDING

The intent of the FAA and NASA is to share in the funding of any cooperative/joint program, consistent with the authority and the approved operating plan of each agency. Each MoA will identify the task assignment and incremental funding over the period of performance. All activities under or pursuant to this MoU are subject to the availability of appropriated funds and no provision herein shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, 31 U.S.C. Section 1341.

VIII. MODIFICATION

This MoU may be modified upon the mutual consent of both parties.

IX. PERIOD OF PERFORMANCE

This MoU shall be effective when signed by both parties and shall remain in effect unless terminated upon written request of either party. All subsequent MoA's shall incorporate appropriate periods of performance.

X. EFFECTIVE DATE

This MoU will take effect upon the date of the last signature appearing below.

David Hinson

THE ADMINISTRATOR

Daniel Goldin

THE ADMINISTRATOR

Sep 11 1995

DATE

Sep 11 1995

DATE